

Letter from Alexander Graham Bell to Mabel Hubbard Bell, November 21, 1904, with transcript

ALEXANDER GRAHAM BELL TO MABEL (Hubbard) BELL Beinn Bhreagh, C. B. Monday, November 21, 1904. Dear Mabel:

We have been struggling with a Vacuum box for days in laboratory — and I am quite disheartened at the inability of the laboratory to produce anything air-tight. Cannot make a simple valve air-tight enough to pump water up a tube to greater height than 2 feet! — far less produce a vacuum sufficient to test strength of our tetrahedral structures. It is maddening. Experimental work needs patience in capital letters. Remembering that we had trouble in making valves long ago when we tried apparatus for artificial respiration — I started out to make partial vacuum by lighting a fire inside box expecting that partial vacuum would be formed by cooling. But we could not make the fire inside box. After first experiment we could not light an alcohol lamp inside on account of vibration of air. We then tried to make fire outside and lead hot air into box. This too was a failure for it took some time to withdraw pipe — and close up hole so that we (practically) lost most of our vacuum before box made air-tight. We have satisfactory bellows on large scale and pumps — but cannot make air-tight check valve to prevent entrance of air when pumped out.

Have tried water with more promising result.

Filled box with water through hole in top. Plugged hole — then discharged water through iron pipe having fall of 25 feet. This should have produced good vacuum in box — but air-tight box (!) leaked like a sieve — and mercury column rose 2 only 2 inches. Haven't given up yet — though time is short. Have ordered box to be completely encased in tin — and soldered up . This surely will give us air-tight box — and the water will give us a sufficient vacuum for purpose without any valve at all.

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More satisfactory progress has been made by Mr. Stewart in making model for a lock — to lock cells together. We are not ready for steel structures yet — as all our time has been devoted to light cells of fragile wood. Experiments in combining cells to form arches, walls and etc., show that we have a great thing here for what may be termed architectural work — but nothing can be done practically in this way without constructing strong cells of metal. This involves time and further experiment to get suitable means of attaching such cells together. Won't pay us to do more here now than make models from which castings can be made. Can't afford more than a day or two on that.

The kite structures are O.K. We are now at work at suitable strong body to hold a man. We will then group together light cells enough to reduce flying weight to practical figure. We have now material enough for this — and we have no time to allow ourselves to be switched off on side issues. The only important side issue that should be tested now — is to ascertain experimentally the strength of tetrahedral structures — and what strain they will stand when completely covered in with air tight material — and partial vacuum formed within. It seems 3 such a simple thing to do — and yet we have not yet completed the first step towards it — the construction of an air-tight box. When we have made box that will give us partial vacuum sufficient to support — say — 15 inches of mercury — then we are prepared to make a few crucial experiments upon strength of structures — from which important consequences should flow.

Just received pencilled note from you — like all your notes — undated . Glad to know you were interested in my account of the fossil egg — it was hurriedly written without stopping for verbal corrections — and I don't want it published therefore.

If Bert cares to print anything on the subject let him write it up himself. If you try to publish my scribbles — I am afraid the result will be that I shall be more careful in writing to you — and scan the phraseology more closely — and then good-bye to letters. If I once allow

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myself to look back upon what I have written then will commence the inevitable erasures and corrections — which make it so difficult for me to write.

My father is happy in the possession of a dear little kitten — which Myrtie brought from Baddeck. Everybody is delighted with it. Everett is taking special care of its food to avoid poisoning. We hope it may escape the fate of the other cats. It has been here for two days — seems to be quite bright and sociable.

I hope this note may reach you on the 25th — your 4 birthday — so that you may know that I am thinking of my little wife so far away. I have nothing specially to say excepting what you already know — that I love you and miss you sorely — and bless the 25th of November that brought you to me. Give my love to your mother and to Elsie, Bert, Daisy and the babies. With a heartfelt love for yourself my nice little wife.

Your loving husband, Alec. Mrs. A. G. Bell, Twin Oaks, Washington, D. C.